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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/879,928	06/14/2001	C. Ward Trussell JR.	NVL 3247	4460

7590

09/02/2003

DEPARTMENT OF THE ARMY,CECOM
INTELLECTUAL PROPERTY DIVISION
AMSEL LG P NVEO (MILTON LEE)
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FORT BELVOIR, VA 22060-5806

EXAMINER

WARREN, MATTHEW E

ART UNIT PAPER NUMBER

2815

DATE MAILED: 09/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/879,928

Applicant(s)

TRUSSELL JR.

Examiner

Matthew E. Warr n

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the Amendment filed on June 12, 2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fields et al. (US 5,139,609) in view of Marchitto et al. (US 6,387,059) and Roberston (US 6,039,632).

With respect to claim 1, Fields et al. shows (fig. 1) a diode array end pumped laser comprising a laser diode (2) having at least one diode bar (18) for providing laser pump light in a vertical and horizontal direction to the optical axis, a first cylindrical lens (4) for collimating the laser pump light in the vertical direction on the optical axis after the laser diode bar(col. 5, lines 35-40), and a second cylindrical lens (6) on the optical axis perpendicular to and after the first cylindrical lens for collecting laser pump light output from the first cylindrical lens and focusing onto a laser slab as focused laser pump light. A laser cavity is provided on the optical axis after the second cylindrical lens comprising a laser slab of solid state crystal (8) with a length, the slab accepting as input the focused laser pump light at the input side with unabsorbed pump light reflected within the laser slab and outputting from the output side absorbed laser energy (26),

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whereby the laser pump light remains collimated perpendicular throughout the laser slab and the pump light further includes laser mode overlap for all of the laser slab length. Fields does not specifically teach that the laser slab of solid state crystal has polished input and output sides. Marchitto et al. discloses (col. 20, line 7 – col. 23, line 33) an end pumped laser in which a laser slab of crystal has polished ends to produce a collimated beam from the crystal (col. 21, lines 5-23). Neither Fields nor Marchitto disclose the laser slab further having rough ground top and bottom surfaces and polished sided surfaces. Robertson discloses (col. 4, lines 16-30) a rectangular laser slab in which the upper and lower sides of the crystal are polished and the side surfaces are roughened. With this configuration, the light propagates in a generally axial direction through the slab and ultimately reduces heat generation in the slab. Although Robertson polishes the upper and lower surfaces instead of roughening the upper and lower surfaces, depending on how the crystal is oriented or from which direction the cavity is viewed, the slab of Robertson may have roughened upper and lower surfaces. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the laser slab crystal of Fields by polishing the ends of the crystal as taught by Marchitto to produce a collimated output beam from the laser slab of crystal. It would have also been obvious to modify the laser slab of Fields or Marchitto by forming the slab having polished upper and lower surfaces and roughened opposing side surfaces as taught by Robertson to minimize heat generation in the slab.

With respect to claim 2, Fields et al. discloses (col. 5, lines 55-63) that the laser cavity further includes a Q-switch having input and output ends on the optical axis, with

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dichroic coatings at said input and output ends, the Q-switch producing peak power pulses.

With respect to claim 3, Fields et al. discloses (col. 5, lines 55-63) a non-linear crystal to produce additional wavelengths.

With respect to claim 4, Fields et al. discloses (col. 5, lines 55-63) that a non-linear crystal is further provided after the laser cavity on the optical axis for producing additional wavelengths.

With respect to claim 5, Fields et al. discloses (col. 5, line 5 – col. 6, line 19) a diode array end pumped slab laser technique comprising the steps of generating laser pump light in the vertical and horizontal direction to the optical axis, collimating the laser pump light in the vertical direction, collecting the laser pump light output from a first cylindrical lens (4) and focusing onto a laser slab (8) as focused laser pump light, and accepting as input the focused laser pump light into a laser cavity including at least a laser crystal (8) having an input and output side, where unabsorbed pump light is reflected within the laser crystal and outputting from the output side absorbed laser energy, Fields does not specifically teach that the laser slab of solid state crystal has remain collimated throughout the crystal. Marchitto et al. discloses (col. 20, line 7 – col. 23, line 33) an end pumped laser in which a laser slab of crystal has polished ends to produce a collimated beam from the crystal (col. 21, lines 5-23). Neither Fields nor Marchitto disclose the laser slab further having rough ground top and bottom surfaces and polished sided surfaces. Robertson discloses (col. 4, lines 16-30) a rectangular laser slab in which the upper and lower sides of the crystal are polished and the side

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surfaces are roughened. The laser light is focused into the input end and remains collimated throughout the slab so that the light reflects off of the side (polished) surfaces through the length of the slab. With this configuration, the light propagates in a generally axial direction through the slab and ultimately reduces heat generation in the slab. Although Robertson polishes the upper and lower surfaces instead of roughening the upper and lower surfaces, depending on how the crystal is oriented or from which direction the cavity is viewed, the slab of Robertson may have roughened upper and lower surfaces. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the laser slab crystal of Fields by polishing the ends of the crystal as taught by Marchitto to produce a collimated output beam from the laser slab of crystal. It would have also been obvious to modify the laser slab of Fields or Marchitto by forming the slab having polished upper and lower surfaces and roughened opposing side surfaces as taught by Robertson to minimize heat generation in the slab.

Response to Arguments

Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (703) 305-0760. The examiner can normally be reached on Mon-Thurs, and alternating Fri, 9:00-5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read "A. Wilson", with a stylized, flowing script.

ALLAN R. WILSON
PRIMARY EXAMINER

MEW

August 25, 2003